

To: Walsh, Debra[Walsh.Debra@epa.gov]
From: Vandenberg, John
Sent: Fri 8/14/2015 3:11:51 PM
Subject: FW: NCEA screening values evaluation re Gold King Mine site
Copy of Gold King Mine draft calcs 8-14-15-rev3.xlsx
References for Arsenic and Lead Dermal Exposure.docx

FYI only.

This is taking all my time right now...

From: Vandenberg, John
Sent: Friday, August 14, 2015 11:09 AM
To: Burke, Thomas; Kavlock, Robert
Cc: Phillips, Linda; Flowers, Lynn; Moya, Jacqueline; Ross, Mary
Subject: NCEA screening values evaluation re Gold King Mine site
Importance: High

Tom,

We've evaluated the R8 work and have performed some other analyses, here is some "bottom line" information to share:

1) NCEA developed separate child and adult screening level values whereas R8 created a combined (child adult) screening level value for oral exposures. With a few exceptions, the NCEA child and adult values bracket the R8 values with the child values lower and adult higher (the NCEA separate child or adult values are typically within a factor of 2 of the R8 values).

Bottom line: the R8 derivation of soil/sediment and surface water oral exposure screening values for hikers/campers is reasonable though it does not provide as much protection for children as the separate child/adult screening level analysis NCEA developed, and we do not have access to all information they utilized (see point 2).

2) NCEA did not have the ‘site-specific adjustments for bioavailability’ that R8 used for As and Pb (we requested this information late yesterday); the R8 screening level values for As sediment ingestion is much higher than NCEA value (~90x for a child) but the screening value for ingestion of As in surface water is similar. For Pb, the R8 screening values for both sediment and water ingestion are lower (more protective by factor of 2-8) than NCEA values.

3) Dermal exposure contributes relatively little to the screening value for combined ingestion and dermal contact with water, for most chemicals. When screening levels are estimated based on a combination of ingestion and dermal exposure using Region 8’s ingestion values and ORD/NCEA’s dermal values, the screening levels are only slightly lower for most chemicals. A few exceptions are: beryllium, cadmium, and chromium.

4) An initial evaluation of absorption data indicates that due to low dermal absorption rates, dermal exposure may be of less or much less concern than ingestion of contaminated sediment or water; however, this is based on CDC, NJDEP and other agency analyses of absorption data for just 2 chemicals (As and Pb)(reference attached)

5) Ingestion of sediment contributes relatively little to the screening value for combined ingestion of sediment and water. We are creating a short paragraph describing the relative contribution of ingestion of sediment versus surface water.

6) An initial evaluation of absorption data indicates that due to low dermal absorption rates, dermal exposure is of less or much less concern than ingestion of contaminated sediment or water.

7) NCEA derived screening level values for more chemicals than R8 did: we also have derived values for antimony, molybdenum, selenium from sediment and surface water ingestion

8) We have not compared the screening level values to the levels measured in the water and sediment and do not have any conclusions regarding exceedances of screening levels.

9) We have not discussed our evaluation with R8 or others; please let us know if you would

like us to do so.

10) Potential synergistic or antagonistic risks from exposure to the polymetal mixture have not been evaluated. Risks to potential at-risk populations such as pregnant women have not been specifically considered. Other exposures (e.g., to contaminated fish) have not been considered. Reasonable parameters have been incorporated into the analysis; these may be modified if desired (e.g., child consumption of sediment, duration of exposure) to consider alternative assumptions in derivation of screening levels values or to estimate risks from current or estimated levels of exposure. The NCEA analyses have only been internally reviewed within NCEA.

11) We welcome an opportunity to walk you through our analysis (spreadsheet attached) and address any questions you may have.

John Vandenberg

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U.S. Environmental Protection Agency

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